10



<u>Claims</u>

What is claimed is:

- 1. An access point for scheduling delivery of units of data to a plurality of access terminals comprising:
 - a) a network interface for receiving data from a communication network;
 - a wireless interface for transmitting units of the data to a plurality of access terminals; and
 - a control system having a plurality of queues corresponding to the plurality of access terminals and adapted to:
 - store the data received over the communication network as units in the plurality of queues for the plurality of access terminals;
 - determine a temporal fading factor based on a current channel condition relative to an average channel condition for each of the plurality of access terminals;
 - iii) determine a throughput fairness factor based on throughput capability for each of the plurality of access terminals;
 - iv) determine a delay Quality of Service (QoS) factor based on delivery times associated with at least one unit for each of the plurality of access terminals;
 - v) calculate a weighting factor based on the temporal fading factor, the throughput fairness factor, and the delay QoS factor for each of the plurality of access terminals; and
 - vi) select a unit for transmission via the wireless interface from one of the plurality of queues based on the weighting factor.
- 2. The access point of claim 1 wherein the control system is further adapted to:
 - a) determine the average channel condition over a period;
 - b) determine the current channel condition; and
 - c) calculate a ratio of the current channel condition to the average channel condition to determine the temporal fading factor.



- 3. The access point of claim 1 wherein the current and average channel conditions are derived from carrier-to-interference ratios.
- 4. The access point of claim 1 wherein the throughput fairness factor is calculated in a manner deemed to achieve a select level of fairness between access terminals having better channel conditions and access terminals having worse channel conditions.
- 5. The access point of claim 1 wherein the throughput fairness factor is a function of the average channel condition.
- 6. The access point of claim 1 wherein the throughput fairness factor is a function of an average throughput rate.
- 7. The access point of claim 6 wherein the throughput fairness factor is a further function of the average channel condition.
- 8. The access point of claim 1 wherein the delay QoS factor for each access terminal is a function of the deliver times for a plurality of the units in each queue including the next unit to transmit in each queue.
- 9. The access point of claim 8 wherein the delay QoS factor for each access terminal is a function of an amount of data to be transmitted.
- 10. The access point of claim 1 wherein the control system is further adapted to:
 - a) calculate a weight inversely proportional to the delivery time for a plurality of the units in each of the plurality of queues; and
 - calculate the delay QoS factors for each access terminal by summing the weights for the plurality of units in each of the plurality of queues.





- 11. The access point of claim 10 wherein the control system is further configured to assign a defined weight for units having a delivery time greater than a defined threshold.
- 12. A method of scheduling transmission of units of data buffered in queues corresponding to a plurality of access terminals, the method comprising:
 - determining a temporal fading factor based on a current channel condition relative to an average channel condition for each of the plurality of access terminals;
 - determining a throughput fairness factor based on throughput capability for each of the plurality of access terminals;
 - determining a delay Quality of Service (QoS) factor based on delivery times associated with at least one unit for each of the plurality of access terminals;
 - calculating a weighting factor based on the temporal fading factor, the throughput fairness factor, and the delay QoS factor for each of the plurality of access terminals; and
 - e) selecting a unit for transmission via the wireless interface from one of the plurality of queues based on the weighting factor.
- 13. The method of claim 12 further comprising:
 - a) determining the average channel condition over a period;
 - b) determining the current channel condition; and
 - c) calculating a ratio of the current channel condition to the average channel condition to determine the temporal fading factor.
- 14. The method of claim 12 wherein the current and average channel conditions are derived from carrier—to-interference ratios.
- 15. The method of claim 12 wherein the throughput fairness factor is calculated in a manner deemed to achieve a select level of fairness between access terminals having better channel conditions and access terminals having worse channel conditions.



- 16. The method of claim 12 wherein the throughput fairness factor is a function of the average channel condition.
- 17. The method of claim 12 wherein the throughput fairness factor is a function of an average throughput rate.
- 18. The method of claim 17 wherein the throughput fairness factor is a further function of the average channel condition.
- 19. The method of claim 12 wherein the delay QoS factor for each access terminal is a function of the delivery times for a plurality of the units in each queue including the next unit to transmit in each queue.
- 20. The method of claim 19 wherein the delay QoS factor for each access terminal is a function of an amount of data to be transmitted.
- 21. The method of claim 12 further comprising:
 - a) calculating a weight inversely proportional to the delivery times for a plurality of the units in each of the plurality of queues; and
 - b) calculating the delay QoS factors for each access terminal by summing the weights for the plurality units in each of the plurality of queues.
- 22. The method of claim 21 further comprising assigning a defined weight for units having a delivery time greater than a defined threshold.
- 23. A computer readable medium having software for scheduling transmission of units of data buffered in queues corresponding to a plurality of access terminals, the software comprising instructions to:
 - determine a temporal fading factor based on a current channel condition relative to an average channel condition for each of the plurality of access terminals;





b) determine a throughput fairness factor based on throughput capability for each of the plurality of access terminals;

14

- determine a delay Quality of Service (QoS) factor based on delivery times associated with at least one unit for each of the plurality of access terminals;
- calculate a weighting factor based on the temporal fading factor,
 the throughput fairness factor, and the delay QoS factor for each of the plurality of access terminals; and
- e) select a unit for transmission via the wireless interface from one of the plurality of queues based on the weighting factor.
- 24. The computer readable medium of claim 23 further comprising instructions to:
 - a) determine the average channel condition over a period;
 - b) determine the current channel condition; and
 - c) calculate a ratio of the current channel condition to the average channel condition to determine the temporal fading factor.
- 25. The computer readable medium of claim 23 wherein the current and average channel conditions are derived from carrier-to-interference ratios.
- 26. The computer readable medium of claim 23 wherein the throughput fairness factor is calculated in a manner deemed to achieve a select level of fairness between access terminals having better channel conditions and access terminals having worse channel conditions.
- 27. The computer readable medium of claim 23 wherein the throughput fairness factor is a function of the average channel condition.
- 28. The computer readable medium of claim 23 wherein the throughput fairness factor is a function of an average throughput rate.





- 29. The computer readable medium of claim 28 wherein the throughput fairness factor is a further function of the average channel condition.
- 30. The computer readable medium of claim 28 wherein the delay QoS factor for each access terminal is a function of the delivery times for a plurality of the units in each queue including the next unit to transmit in each queue.
- 31. The computer readable medium of claim 30 wherein the delay QoS factor for each access terminal is a function of an amount of data to be transmitted.
- 32. The computer readable medium of claim 28 further comprising instructions to:
 - a) calculate weight inversely proportional to the delivery times for a plurality of the units in each of the plurality of queues; and
 - b) calculate the delay QoS factors for each access terminal by summing the weights for the plurality of units in each of the plurality of queues.
- 33. The computer readable medium of claim 28 further comprising instructions to assign a defined weight for units having a delivery time greater than a defined threshold.